We claim:

1. A scaffold system which is seeded after implantation to enhance *in vivo* survival of the seeded cells, comprising:

a porous three-dimensional scaffold having generally interconnected pores within the scaffold of between approximately 100 and 300 microns in diameter and composed of a biocompatible polymer selected from the group consisting of polyanhydrides, polyorthoesters, polyglycolic acid, polylactic acid, copolymers and blends thereof, collagen, ethylene vinyl acetate, derivatives of polyvinyl alcohol, teflon, nylon, and silicone,

wherein the scaffold provides sufficient surface area to permit attachment of an amount of the cells effective to produce functional vascularized organ tissue *in vivo*; and

wherein the scaffold is resistant to compression within the patient, thereby maintaining the pore size of the scaffold to between approximately 100 and 300 microns, and

wherein the scaffold of a structure which allows vascular ingrowth to produce a highly vascularized scaffold and the introduction of cells into the vascularized scaffold without damage to the cells or patient,

in combination with means for introduction of parenchymal cells into the scaffold following implantation into a patient.

2. The scaffold of claim 1, further comprising compounds selected from the group consisting of growth factors, compounds stimulating angiogenesis, and immunomodulators.

3. The scaffold of claim 1, wherein the scaffold is configured to provide separate areas of attachment for cells of different origin.

4. The scaffold of claim 1, wherein the means for introduction are channels molded into the matrix.

5. The scaffold of claim 1, wherein the means for introduction is a catheter.

6. The scaffold of claim 1, wherein the scaffold is formed of a biodegradable polymer selected from the group consisting of polyanhydride, polyorthoester, polyglycolic acid, polylactic acid, copolymers and blends thereof, and collagen.

7. The scaffold of claim 1, wherein the scaffold is formed of a non-degradable polymer selected from the group consisting of ethylene vinyl acetate, derivatives of polyvinyl alcohol, teflon, nylon, and silicon.

8. The scaffold of claim 1 seeded with cells selected from the group consisting of bile duct cells, parathyroid cells, thyroid cells, cells of the adrenal-hypothalamic-pituitary axis, heart muscle cells, kidney basement membrane cells, nerve cells, blood vessel cells, intestinal cells, bone forming cells cartilage forming cells, smooth muscle cells and skeletal muscle cells.

9. The scaffold of claim 8, wherein the cells are dissociated hepatic cells.

10. The scaffold of claim 1 formed of a derivative of polyvinyl alcohol.

11. A scaffold composition which is seeded after implantation to enhance *in vivo* survival of the seeded cells, comprising:

a porous three-dimensional scaffold having a sponge or foam structure and having generally interconnected pores within the scaffold of between approximately 100 and 300 microns in diameter and composed of a biocompatible polymer selected from the group consisting of polyanhydrides, polyorthoesters, polyglycolic acid, polylactic acid, copolymers and blends thereof, collagen, ethylene vinyl acetate, derivatives of polyvinyl alcohol, teflon, nylon, and silicone,

wherein the scaffold provides sufficient surface area to permit attachment of an amount of the cells effective to produce functional vascularized organ tissue *in vivo*; and

wherein the scaffold is resistant to compression within the patient, thereby maintaining the pore size of the scaffold to between approximately 100 and 300 microns, and

wherein the scaffold is of a structure which allows vascular ingrowth to produce a highly vascularized scaffold and the introduction of cells into the vascularized scaffold without damage to the cells or patient,

in combination with means for introduction of parenchymal cells into the scaffold following implantation into a patient.

12. The scaffold of claim 11, further comprising compounds selected from the group consisting of growth factors, compounds stimulating angiogenesis, and immunomodulators.

13. The scaffold of claim 11, wherein the scaffold is configured to provide separate areas of attachment for cells of different origin.

14. The scaffold of claim 11, wherein the means for introduction are channels molded into the matrix.

15. The scaffold of claim 11, wherein the means for introduction are a catheter.

16. The scaffold of claim 11, wherein the scaffold is formed of a biodegradable polymer selected from the group consisting of polyanhydride, polyorthoester, polyglycolic acid, polylactic acid, copolymers and blends thereof, and collagen.

17. The scaffold of claim 11, wherein the scaffold is formed of a non-degradable polymer selected from the group consisting of ethylene vinyl acetate, derivatives of polyvinyl alcohol, teflon, nylon, and silicon.

18. The scaffold of claim 11 seeded with cells selected from the group consisting of bile duct cells, parathyroid cells, thyroid cells, cells of the adrenal-hypothalamic-pituitary axis, heart muscle cells, kidney basement membrane cells, nerve cells, blood vessel cells, intestinal cells, bone forming cells cartilage forming cells, smooth muscle cells and skeletal muscle cells.

19. The scaffold of claim 18, wherein the cells are dissociated hepatic cells.

20. The scaffold of claim 11 formed of a derivative of polyvinyl alcohol.